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PACIFIC OCEANIC FISHERY
INVESTIGATIONS

PACIFIC SALMON DRIFT GILL NETTING

By Norman B. Wigutoff*

A gill net is one of the oldest forms of nets used for commercial fishing. In effect, it is an upright fence of netting with an appropriate mesh to permit fish of certain size to pass only part way through. The fish is then "gilled" and can neither go forward nor back (Figure 1). Gill

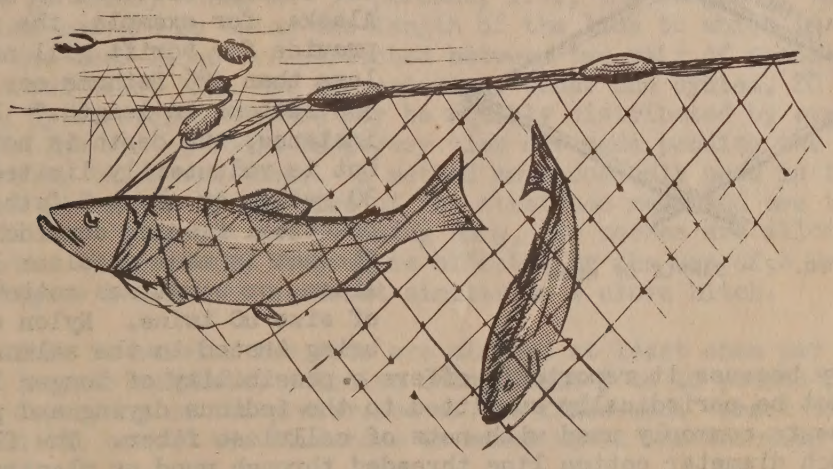

FIG. 1 - GILLING ACTION OF SALMON GILL NET

nets are versatile, for various sizes of mesh can be used and the net can be suspended at the surface or the bottom merely be controlling the size and number of floats on the top level and lead weights on the bottom, or at intermediate depths by the addition of floats and buoy lines. They may be operated as stationary or movable gear.

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Drift gill nets are used extensively in the Pacific salmon fisheries. One end of the net floats or drifts freely in the current while the other end is fastened to the boat. These nets are normally operated by one man, except in areas where large catches are made. They are employed at or near the mouths of larger rivers on the Pacific coast of the United States, British Columbia and Alaska where the waters are dark in color or laden with silt or mud. In relatively clear waters the nets are usually fished at night for the salmon can avoid them in the daylight hours. Dependent on the prevalent species in the locality, the size of mesh may be selected to capture King, or Chinook, Silver, Sockeye, Pink, and Chum Salmon.

Sizes and Specifications

In general, the sizes of the mesh range from 5 to 9½ inches stretched measure, according to a minimum size often prescribed by regulations (Figure 2). The length of the net, and sometimes the depth, is also established by regulations. In the Stikine District in Southeastern Alaska, for example, the regulations provide for "drift gill nets of not less than 125 fathoms nor more than 300 fathoms in length." In this instance, the depth is not prescribed but is voluntarily limited to 25 to 30 meshes or about 3 fathoms deep by practical fishing considerations. The net is made of slack laid flax, linen, or sometimes cotton, generally of size 40 twine. Nylon netting is being tested in the salmon gill net fishery because it reportedly offers a possibility of longer life and need not be periodically submitted to the tedious drying and preservative treatments commonly used with nets of cellulose fiber. The float line is 1/2-inch diameter cotton line threaded through wood or plastic floats ellipsoidal in shape, about 6 inches in length and 3 to 3-1/2 inches in diameter, and spaced at intervals of from 24 to 36 inches (Figure 3).

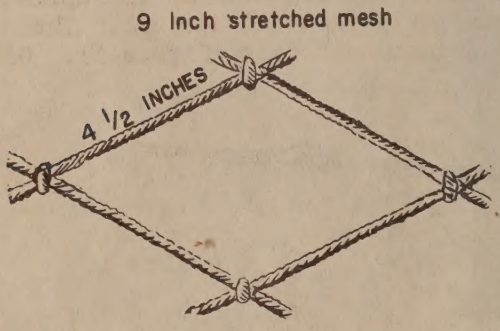

FIG. 2 - SAMPLE OF MESH

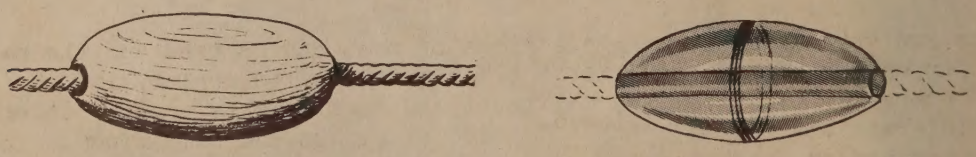

FIG. 3 - TYPICAL WOOD AND PLASTIC FLOATS

The lead line is 1/4 to 3/8-inch diameter cotton with ellipsoidal leads, weighing from 2 to 3 ounces, moulded or crimped on and spaced from 6 to 18 inches apart.

Hanging Gill Nets

FIG. 4 - HANGING KNOT

Normally, the nets are purchased from marine supply houses on the Pacific Coast completely fitted and ready to use. Some fishermen prefer to purchase their nets as they come from the factory and then sew on by hand the selvage or border mesh. Medium or soft laid cotton seine twine of a thread size varying from 24 to 48 thread is fastened to the edges of the netting by using a netting needle and tying weavers knots. The cotton selvage is hung slightly longer than the linen mesh to allow for shrinking and setting of the knots when wet.

Before hanging the net, the float and lead lines must be "run" to remove surplus turns or the lines will kink when in use and foul the net, making them difficult to handle and reducing their efficiency. The netting may be hung to the lines by either of the two procedures. Either way the netting is generally "hung in" 50 percent, i.e., the length of the netting by stretched measure is twice the length of the line to which it is hung. The float and lead lines are stretched between two pair of posts so that they are about waist high for convenience. Under one system, 20 fathoms of netting by stretched measure may be equally distributed by eye along 10 fathoms of line and periodic temporary ties are made pending the final securing by handing twine and knots. A method more commonly used is to cut a stick equal in length to the size of the stretched mesh and use this to mark the lines. When the net is being hung, two meshes are allotted to each of the marked spaces. The hanging is effected by the use of a hanging knot shown in Figure 4 which is somewhat similar to a clove hitch.

When in service the nets are cleaned at least once per week in a bluestone (copper sulphate) solution using about 5 to 10 pounds per barrel of water, depending on the preference of the fishermen. Exact solutions are seldom used but rather the bluestone is added until the solution has a deep blue color.

Types of Craft

A wide variety of craft is used in the gill net fishery. In Bristol Bay sail and oars have been the motive power until recently, but motor powered boats are now allowed. In some areas outboard motors are common. On the Columbia river "bow pickers" are most common. These vary from 25 to 35 feet in length and carry the net in a forward cockpit. The net is set by passing alongside a raised shelter amidship and is hauled over a powered roller near the bow (Figure 5).

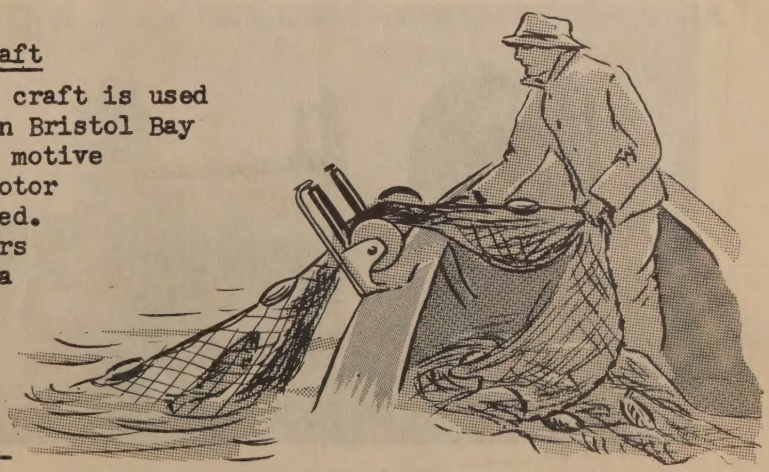

FIG. 5 - BOW TYPE INTAKE ROLLER

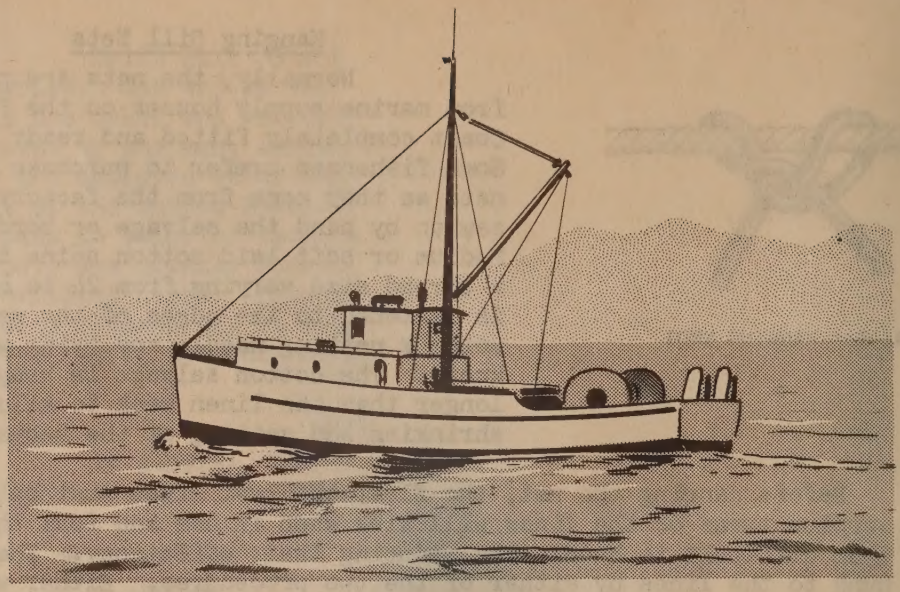

FIG. 6 - TYPICAL POWER DRIVEN SALMON GILL NET CRAFT

In British Columbia and Puget Sound, the type of vessel in common use is shown in Figure 6. These are power driven and vary from about 25 to 40 feet in length. The stern is fitted with a cockpit containing remote controls for maneuvering the boat and a powered reel, 4 to 6 feet in diameter and fairleads for hauling and setting the net.

The Reel

The reel or drum is powered by a chain or v-belt from a power take off, or directly by a small electric motor to facilitate hauling the net. The size of the reel on which the net is rolled varies considerably from boat to boat depending on the individual fisherman's preference, the depth of the net used, and the size of his boat. In the table on the following page are listed the range of sizes of the reel and accessories commonly used.

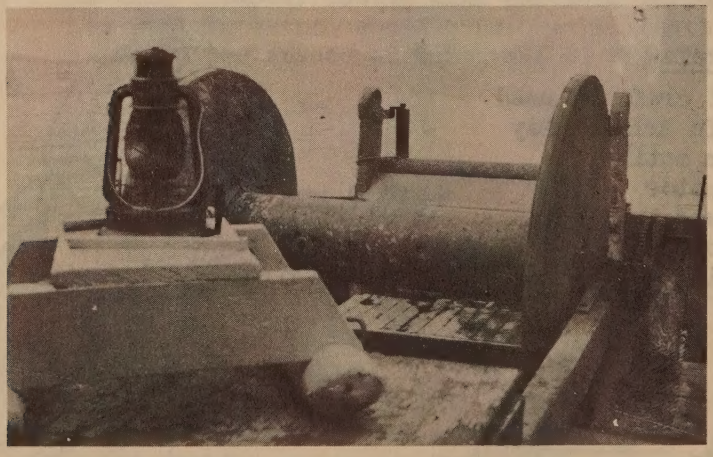

FIG. 7 - NET BUOY, SHOWING KEROSENE LANTERN FOR NIGHT FISHING

FIG. 8 - STERN ROLLER

Diameter, reel flanges	4 to 6 feet
Diameter, reel hub	10 to 24 inches
Length between flanges	2 to 5 feet
Size of shafting	1 to 2 inches
Speed of rotation of reel	20 to 40 rpm
Distance from reel to rollers	3 to 4 feet

Setting the Net

The first item to be set is a buoy (Figure 7), which is tied to the float line. When fishing at night, the buoy is fitted with a kerosene lantern. The reel is then freed and the boat's course set across the current. As the boat runs along, the fisherman stands alongside the reel and allows the net to run out over a 6-inch horizontal roller and between 2-inch vertical rollers fastened to stanchions as shown in Figure 8. When the entire net is out, the boat and gear are allowed to drift (Figure 9). The end of the net is hung over one of the stanchions by a loop in the end

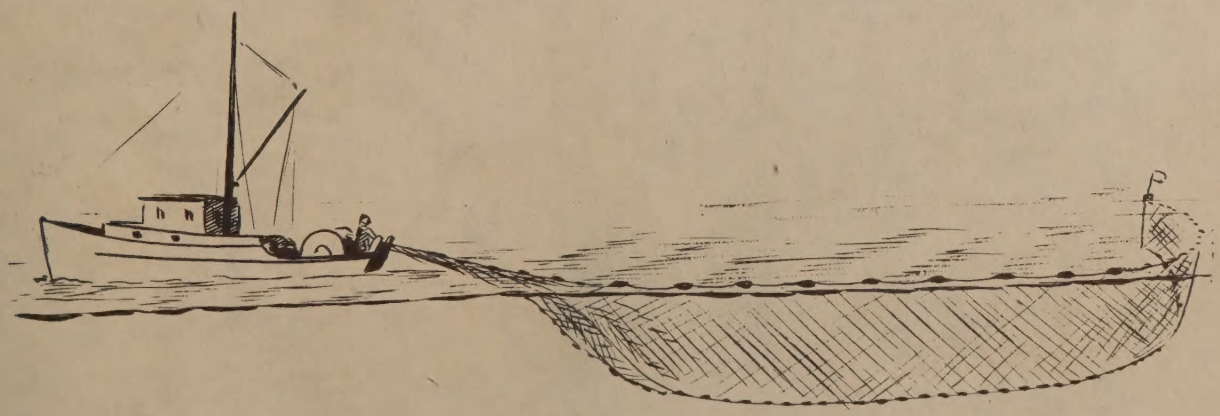

FIG. 9 - TYPICAL GILL NET CRAFT DRIFTING WITH SET NET

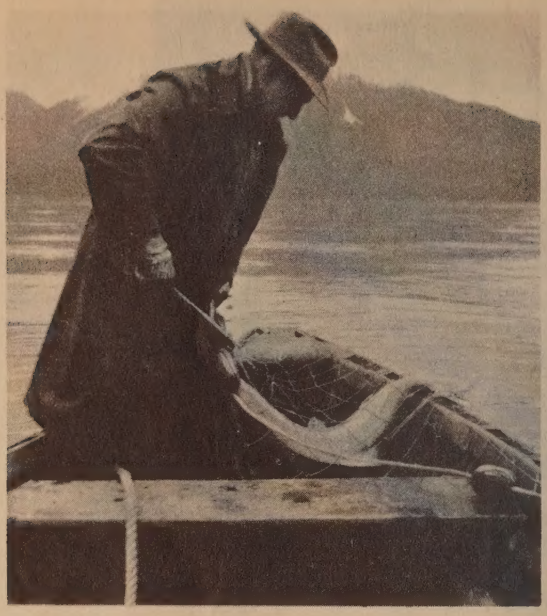

FIG. 10 - GAFFING SALMON

of the float line. Usually the net is set about two hours before high or low water slack and is taken in about two hours after the tide has turned, but this practice varies from area to area depending on the behavior of the fish.

In some areas where predators such as seals damage the gilled salmon, the fisherman may periodically follow the net in a row boat by pulling hand over hand along the float line and examining the net for fish. The gilled fish are brought into the rowboat, with the aid of a gaff, and removed from the netting (Figure 10). In most areas the net is not patrolled but hauled after an appropriate time, at the judgment of the fisherman, or when the gear is in danger.

As soon as the fish are brought aboard the larger boat, they are eviscerated and blood washed off with salt water, or kept round. Usually, the fishing grounds are only a few hours from port and the fish are placed in a wooden box on deck and covered with a wet canvas.

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